Haiti Relief

An International Effort Enabled through Air, Space, and Cyberspace

Gen Douglas M. Fraser, USAF
Maj Wendell S. Hertzelle, USAF

To the people of Haiti, we say clearly, and with conviction, you will not be forsaken; you will not be forgotten. In this, your hour of greatest need, America stands with you.

—Pres. Barack Obama, 14 January 2010

On 12 January 2010 at 21:53:10 Greenwich Mean Time, Haiti experienced a 7.0-magnitude earthquake centered 10 miles west-southwest of Port-au-Prince.[1] Several factors contributed to the destructiveness of this quake: its shallowness, which made the shock waves much more pronounced; the overcrowded capital city, which was overdeveloped with inconsistently applied and loosely enforced construction standards; and the lingering effects of a string of three hurricanes and one tropical storm that struck during a 23-day period in the summer of 2008. Almost 150 years had passed since Haiti had fallen victim to an earthquake of this magnitude. The devastation proved tremendous. The latest United Nations (UN) estimates indicate that more than 222,000 people were killed, 300,000 injured, and 2.3 million displaced by the earthquake and its 59 aftershocks.[2]

Thirteen of the 15 government ministry buildings were completely destroyed. Forty to 50 percent of all buildings in Port-au-Prince and its environs sustained significant damage, some locales as much as 80 percent, as in Léogâne, a city of 78,477 people 19 miles west of Port-au-Prince.[3] The earthquake rendered the airport's control tower inoperable and left more than half the seaport in ruins. Later that night, the president of Haiti declared a national state of emergency and, in doing so, requested that the United States help provide humanitarian assistance and disaster relief. The US ambassador to Haiti responded by issuing a disaster declaration, confirming that the situation warranted US aid.

At dawn on 13 January, under the direction of United States Southern Command (USSOUTHCOM), elements of the Department of Defense (DOD) arrived to support the Government of Haiti (GoH) and the US Embassy. In Miami, USSOUTHCOM's headquarters staff received specialty augmentation from across the DOD and the rest of the US government to increase the staff's ability to respond to the disaster. In addition, on 14 January the command established Headquarters Joint Task Force-Haiti, led by Lt Gen P. K. "Ken" Keen, with the mission of carrying out humanitarian assistance and disaster-relief operations in support of the United States Agency for International Development, the principal federal agency for the US effort. So began Opera-

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DOD photo

A US Soldier briefs Gen Douglas Fraser, left, and Lt Gen Ken Keen, center, at Ancien Aeroport Militaire's displaced-persons camp in Port-au-Prince on 6 March 2010.

tion Unified Response, an incredible international effort to help a nation. The innovative and swift application of air, space, and cyberspace capabilities enabled a rapid, flexible, and focused response that saved lives and mitigated suffering.

Opening the "Lifeline"

Due to the magnitude of destruction and uncertainty about the condition of the runway at Toussaint L'Ouverture International Airport in Port-au-Prince, Lieutenant General Keen and I believed that the airfield "needed someone on the ground quickly and [that] a safely operating airfield was essential."[4] Accordingly, the 1st Special Operations Wing's Joint Special Operations Air Component quickly received a tasking and arrived approximately 26 hours after the

earthquake. Adapting to bare-bones conditions, controllers set up their equipment and began directing traffic within 28 minutes of arriving.[5]

The following day, to support the efforts of this unit and the Haiti relief operations, Airmen from Joint Base McGuire-Dix-Lakehurst, New Jersey, launched the 817th Contingency Response Group under the command of Col Patrick Hollrah, who commented on their fast reaction: "This is what we are trained to do and it's what we do well—we respond rapidly and effectively in hopes we can alleviate unnecessary suffering and provide a platform for further relief efforts."[6] Prior to the earthquake, Toussaint L'Ouverture International Airport averaged 12 to 15 flights per day. Afterward, within 72 hours, the combined efforts of the wing and group took the airfield from limited

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daylight operations with rudimentary control and cargo processing to around-the-clock operations of over 60 flights per day. Over the next few days, these innovative Battlefield Airmen increased the activity on this single runway, which had no parallel taxiway, to over 140 fixed-wing and 200 rotary-wing flights per day.

By opening the air lines of communication, Airmen established a friendly center of gravity and, from Lieutenant General Keen's perspective, created a "lifeline for Haiti—from civilian [nongovernmental organizations]."[7] For the first three to four days following the earthquake, the Port-au-Prince airport served as the primary entrance to Haiti. In addition to Las Américas International Airport in Santo Domingo, San Isidro Air Base in Santo Domingo and Maria Montez Air Base in Baharona, Dominican Republic, opened as alternate airfields on 19 January. A Canadian team opened Jacmel Airfield, in southern Haiti, to support its operations. Even though these airfields offered critical support and divert destinations for aircraft arriving from around the globe, overland travel time and congested two-lane highways limited their combined utility to roughly 7 percent of the total air cargo arriving in Haiti.

Using these airfields, search and rescue units from around the world as well as the US Agency for International Development's disaster-assistance response teams arrived quickly to begin rescue operations. Lieutenant General Keen pointed out that "getting there in hours, not days, saved lives," reflected by the rescue of 132 individuals trapped in rubble.[8] This simply would not have happened without the speed of airflow and the cargo-handling efficiency supplied by US Air Force Airmen through the aerial port in Haiti.

Organizing and Controlling Relief Flights into Haiti

Building the smooth flow of a vast array of international relief aircraft into Port-au-Prince did not occur easily. Prior to the earthquake, daily airfield traffic volume amounted to about 30 movements (a movement equals one landing or takeoff). By way of comparison, Miami International Airport averaged some 1,000 movements per day in 2009.[9] As mentioned earlier, the sole runway with no parallel taxiway and a single point of entry/exit to the ramp from the runway represented the key impediments to increasing flow at the airport. In addition to these limitations, the ramp had only 10 parking locations under ideal conditions (for two wide-body and approximately six smaller aircraft). Finally, further constraints on aircraft and cargo throughput included the variety of aircraft; cargo loads, as well as download time for both passengers and cargo; and the need to accommodate "super wide-body" jets.[10]

To reconcile these issues and establish a more orderly flow, the GoH requested that the US Air Force and the Federal Aviation Administration establish a Haiti Flight Operations Coordination Center (HFOCC) to manage inbound air traffic and speed up delivery of humanitarian aid.[11] In concert with the GoH, the UN, and the World Food Program, the HFOCC provided coordinated and collaborative command and control for the efficient delivery of relief supplies to meet the GoH's priorities.

The HFOCC implemented a process using a phone registration system, coordinating calls through the 601st Air Operations Center at Tyndall AFB, Florida.[12] Aircrews received a notice to Airmen from the International Civil Aviation Organization to contact the 601st's call center and coordination center for scheduling "slot times" for arrival into the Port-au-Prince airport. This process emerged from lessons learned during the support of aerial relief operations for Hurricane Katrina. The HFOCC modeled it after Air Mobility Command's concept of the regional air movement coordination center. The slot-times system allowed for an orderly, prioritized, and controlled flow of aircraft into Haiti.

Working to accommodate the international response, the World Food Program sent a representative—Philippe Martou, its deputy chief of aviation services—to the HFOCC in Tyndall to support the GoH and international management of air traffic into Haiti. His invaluable support and expertise helped the 601st Air Operations Center and Air Forces Southern manage the airflow into Haiti. According to Julissa Reynoso of the US Department of State, "After the implementation of the HFOCC, no aircraft operator who requested a 'slot time' was denied; however, they may not have received the exact slot they requested."[13] At the height of the relief effort, operating at 120–40 flights per day, organizations requesting slot times still faced a backlog of 10 days (1,400 slots reserved). However, when urgent requests for prioritization came in, Ms. Reynoso played a key role in working with the GoH to ensure a proper flow of arriving aircraft, in accordance with established GoH priorities.

Unfortunately, the phone system could not meet the demand and became saturated. To facilitate customer requests and increase transparency, USSOUTHCOM communications and information-management experts, working with the HFOCC, developed a web-based system for assigning slot arrival times. Although this program underwent "beta testing" during Unified Response, it never went live. Nevertheless, the system has potential for use in future disasters.

Through the skill of the airfield controllers, the work of the 817th Contingency Response Group's cargo handlers and logistics technicians, and the efficiencies created by the slot-time system, traffic at the Port-au-Prince airport reached its peak. However, as alternative logistical options became available, demand at Toussaint L'Ouverture International slowly decreased, and by 19 February, civilian commercial airline service to the nation had resumed, completely under the control and management of Haitian air traffic controllers.

Broadening the Support Base through Teamwork

From all across the United States, assistance converged on Haiti. Although constituting only a small piece of the entire effort, at least 71 wing-level units from active, Guard, and Reserve components at more than 35 locations supported the movement of relief materials and supplies, exemplifying the Air Force's "total force" model. Still, in order to meet the level of support required in Haiti, yet continue to satisfy demands in Iraq and Afghanistan, Air Mobility Command brought into play aircraft normally reserved for training.

The command made an all-out effort to surge its capacity and meet the logistical challenges. In solidarity with the Department of State, it assured the safe evacuation of 16,412 American citizens and eligible family members—perhaps the largest evacuation that has ever occurred in peacetime. Furthermore, US military aircraft medically evacuated 343 injured Haitians. Continuing this display of teamwork, Joint Base McGuire-Dix-Lakehurst received one of the first large groups of US citizens. Working with the Department of Health and Human Services, Department of State, Department of Homeland Security, Red Cross, and scores of local civic and religious organizations in New Jersey, the base's forces erected a temporary relief center for receiving, feeding, medically treating, and reuniting 579 personnel with their families.

Intelligence, Surveillance, and Reconnaissance

The devastation left behind by the earthquake presented many challenges, but it also opened the door for innovative uses of military and civilian imaging assets. The critical visual imagery and data that they collected helped inform decisions concerning the distribution of humanitarian aid, assess damage to buildings and other infra-

structure, and alert relief agencies to potential locations of increased risk.

Within two days of the earthquake, an Air Force Global Hawk remotely piloted aircraft (RPA) and a Navy P-3 began transmitting visual data needed to assess critical infrastructure such as airfields, ports, roads, bridges, and key buildings in Haiti. Moreover, a U-2 gathered very high resolution imagery of Port-au-Prince, expediting the assessment of damage.

In addition to still photos, Predator RPAs collected full-motion video during around-the-clock coverage of select areas in the country. Joining with the DOD to enhance our humanitarian response to this crisis, the Federal Aviation Administration signed an emergency certificate of authorization allowing RPA operation from the civilian airfield of Rafael Hernandez, Puerto Rico, into Haiti. This action marked the first time a Predator had supported a humanitarian operation, proving that RPAs can operate safely alongside civilian and international air traffic.[14] Dissemination of the video collected by the Predators to a variety of users, both on the ground in Haiti and at locations outside the area of operations, provided vital situational awareness for humanitarian assistance / foreign disaster-relief operations and helped pinpoint potential hot spots that might compromise relief activities.[15]

However, imagery was only a first step. In partnership with Google, high-tech government contractors from USSOUTHCOM created a real-time interactive and collaborative environment that generated a three-dimensional image of the devastation in Haiti.[16] By comparing historical satellite imagery taken by Google with images captured by intelligence, surveillance, and reconnaissance (ISR) aircraft after the earthquake, analysts could assess the level of destruction. Fortuitously, an earlier collaborative effort among 10 space agencies from around the globe produced the international charter known as "Space and Major Disasters" to deliver free imagery products to victims of natural or man-made disasters. On 13 January 2010, this charter was acti-

vated for Haiti so that it could receive this imagery.[17] Assessments made from available imagery allowed engineers to prioritize their efforts and permitted the UN to determine alternatives for sheltering displaced persons.

Though laudable, the sharing and collaborating that took place during Unified Response still did not overcome some of the fundamental difficulties inherent in synthesizing multiple systems. Michael Moore, deputy director of the Joint Intelligence Operation Center-South, remarked that during Haiti "we did not have end-to-end ISR architecture and capability. The information was not interoperable and to make a composite picture, we had to stitch it together."[18] Planners need to revisit this challenge as they prepare for future relief operations.

Providing Distribution Alternatives

A Light Detection and Ranging System, deployed by the Massachusetts Institute of Technology's Lincoln Laboratory aboard a Sabreliner aircraft, created a unique three-dimensional image of the terrain, helping geologists identify fault areas around Haiti and focusing debris-removal efforts. The heightened situational awareness produced by this and other imaging systems enabled the joint task force to identify blocked transportation routes and helped other relief organizations adjust delivery routes and expedite distribution.

Due to congested distribution routes and the lack of infrastructure, aerial means became essential for the immediate delivery of relief supplies. Specifically, helicopters from the USS *Carl Vinson*, the 22d Marine Expeditionary Unit of the USS *Bataan* Amphibious Ready Group, and the 24th Marine Expeditionary Unit of the USS *Nassau* Amphibious Ready Group dispensed these supplies to secured landing zones. The latter were coordinated with the GoH in accordance with distribution plans developed by the UN and the US Agency for International Development / Office of Foreign Disaster

Assistance. To ensure the orderly dissemination of supplies, prior to delivery we put in place security forces from various sources such as the UN Police, UN Stabilization Mission in Haiti, Haitian National Police, 82d Airborne, and 22d Marine Expeditionary Unit.

Aerial delivery from US Air Force C-17s, used on a limited basis, constituted yet another option. For example, on 18 January 2010, Airmen from the 437th Airlift Wing at Charleston AFB, South Carolina, delivered 14,000 meals, ready to eat and 14,000 quarts of water during a seven-hour round-trip mission. While the jet was en route, members of Joint Task Force-Haiti secured the area to ensure the safety of the local populace and effect the distribution.[19]

Both rotary- and fixed-wing delivery methods offered the flexibility to swiftly reach people in need. Yet, along with this flexibility came such issues as placing security and relief personnel on scene at each location to secure distribution points and enable the safe and orderly disbursement of relief supplies. This effort required effective planning and coordination across the international community, under the direction of the government.

Leveraging Cyberspace Capabilities

Adapting to lessons learned from past responses to disasters, USSOUTHCOM dedicated significant energy to making available an unclassified, open-source method of sharing information with the entire international relief community. We used the All Partners Access Network (APAN), a web-based tool designed by US Pacific Command, to enhance collaboration and operational coordination. With its open password registration, APAN attracted over 1,800 users during the first three weeks and quickly

Container Delivery System bundles from a US Air Force C-17 coming down outside Port-au-Prince

became one of USSOUTHCOM's chief means of sharing information outside the command's domain. "Social networking" helped USSOUTHCOM respond to requests for assistance, maintain situational awareness through user updates, and share DOD imagery with the international community.

In addition to employing APAN to spread information, the command used various other social networking services such as Facebook, Twitter, Flicker, YouTube, and ReliefWeb to gather and share information. All played a part in providing an accessible source of data to responders. However, the huge volume of information presented the command with the challenge of "min[ing], compil[ing], analyz[ing] and disseminat[ing] both traditional and non-traditional data sources at the speed of the information environment."[20]

At the same time, and in partnership with Google, USSOUTHCOM created a web-enabled user-defined operational picture. That is, non-DOD users, academics, and people on the street in Haiti uploaded pictures from their smart phones and shared other geospatial information through the web, all linked to the three-dimensional Google Earth user-defined operational picture, which enhanced collaborative situational awareness. However, if we accept data from various sources, then we must take time to discern whether some of it might be disinformation if perceived in the wrong context. Therefore, peer review be-

comes important, and the fusion of peer-reviewed data uploaded to a common point of reference gives participants a clearer picture of what is occurring. By utilizing Web 2.0 technologies such as portals, wikis, blogs, and chat rooms, USSOUTHCOM is building a flatter, faster information environment for use in future relief operations.

Conclusion

The US Agency for International Development recently reported that, to date, the US government's response to the Haiti earthquake totaled $1,156,554,816. Certainly a vast amount, this expenditure of resources nevertheless pales in comparison to the partnerships, relationships, and international commitment that made a relief effort such as Operation Unified Response a success. This level of teamwork comes together only through trust and interoperability garnered from training and shared experiences.

As Haiti recovers and rebuilds, these same assets will continue to pay dividends. Undoubtedly, future humanitarian assistance / foreign disaster-relief operations will benefit from the innovative air, space, and cyberspace applications that lent swift aid to a devastated nation. ✪

Notes

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3. "Haiti," *City Population*, 15 March 2010, accessed 18 October 2010, http://www.citypopulation.de/Haiti.html.

4. Lt Gen P. K. Keen, interview by the author, 27 August 2010.

5. 612th Air Operations Center / Air Mobility Division, briefing, subject: Operation Unified Response, 26 March 2010.

6. "AMC Provides Rapid Response for Haiti Relief Effort: Operation Unified Response," *Airlift/Tanker Quarterly* 18, no. 1 (Winter 2010): 19, accessed 18 October 2010, http://www.atalink.org/ATQ/Issues/ATQ_Winter_2010.pdf.

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14. Capt Nathan D. Broshear, "Airmen Fly Predator in Controlled Airspace over Haiti," *Air Force Link*, 28 January 2010, accessed 18 October 2010, http://www.af.mil/news/story.asp?id = 123187806.

15. Warren D. "Doug" Quets Jr., senior ISR adviser, Twelfth Air Force (AFSOUTH), interview by the author, 7 September 2010.

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18. Michael Moore, USSOUTHCOM J2, deputy director, Joint Intelligence Operation Center-South, interview by the author, 27 August 2010.

19. "Air Deliveries Provide Critical Supplies to Earthquake Victims," *Air Force Link*, 18 January 2010, accessed 18 October 2010, http://www.af.mil /news/story.asp?id = 123186092.

20. Moore, interview.

Gen Douglas M. Fraser, USAF

General Fraser (USAFA; MS, Arizona State University; MS, National War College) is the commander of US Southern Command (USSOUTHCOM), Miami, Florida. He commands one of six geographic combatant commands that promote US strategic security interests. USSOUTHCOM is a joint, multinational, and interagency organization charged with overseeing all US military operations in Central and South America and the Caribbean, a region that includes 31 countries and 10 territories with a population of more than 470 million. Prior to assuming his current position, he served as the deputy commander of US Pacific Command and the commander of Alaska Command. A command pilot with more than 2,700 flying hours, primarily in the F-15A/B/C/D, F-15E, and F-16, General Fraser is a graduate of Squadron Officer School, Air Command and Staff College, and National War College.

Maj Wendell S. Hertzelle, USAF

Major Hertzelle (USAFA; MSAA, University of Washington) is the Air Force special assistant to the commander in the Commander's Action Group, US Southern Command. He provides quick-turn focused action, strategic communication, and operational research and analysis to support the commander's strategic objectives. Prior to his current position, he was interagency coordinator for development in the J9 and air operations officer for the Standing Joint Force Headquarters. He has served as an instructor and evaluator pilot in the KC-135R/T, flying both tanker and receiver versions in support of conventional and special operations contingencies around the globe. He has deployed in support of Operations Southern Watch, Allied Force, Iraqi Freedom, and Enduring Freedom. Major Hertzelle is a graduate of Squadron Officer School, Air Command and Staff College, and Joint Forces Staff College.